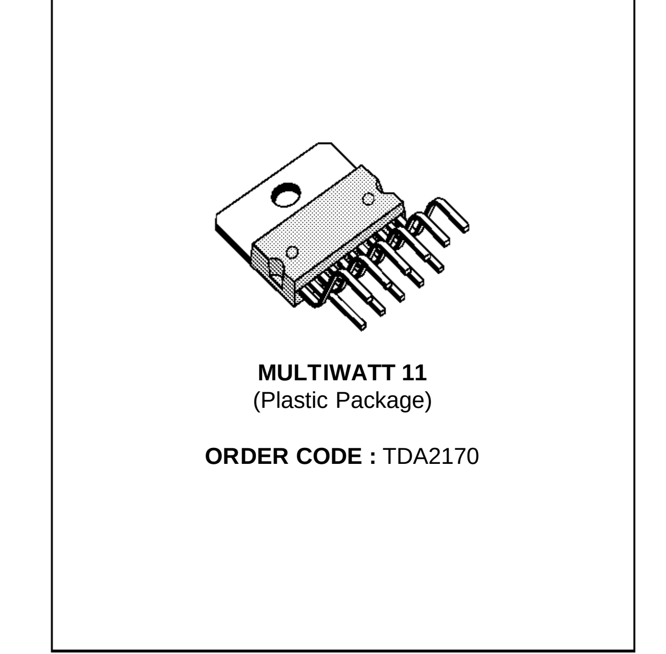


TDA2170

TV VERTICAL DEFLECTION OUTPUT CIRCUIT

The functions incorporated are :

- POWER AMPLIFIER
- FLYBACK GENERATOR
- REFERENCE VOLTAGE
- THERMAL PROTECTION



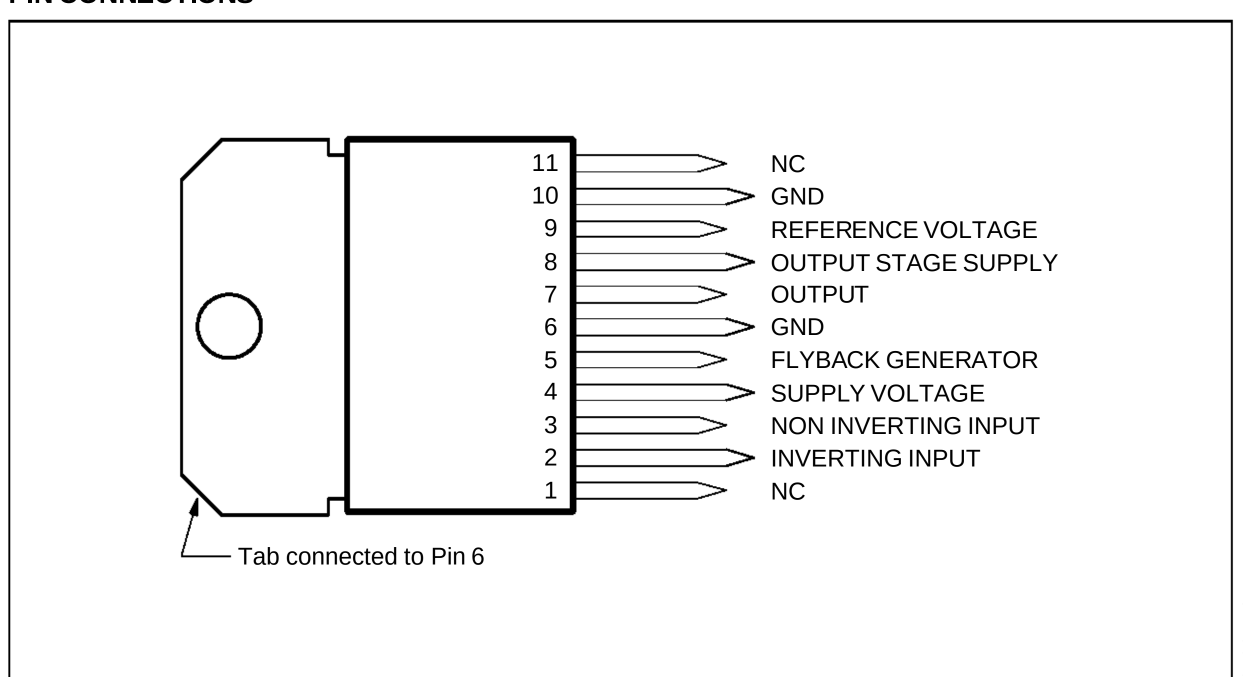
MULTIWATT 11
(Plastic Package)

ORDER CODE : TDA2170

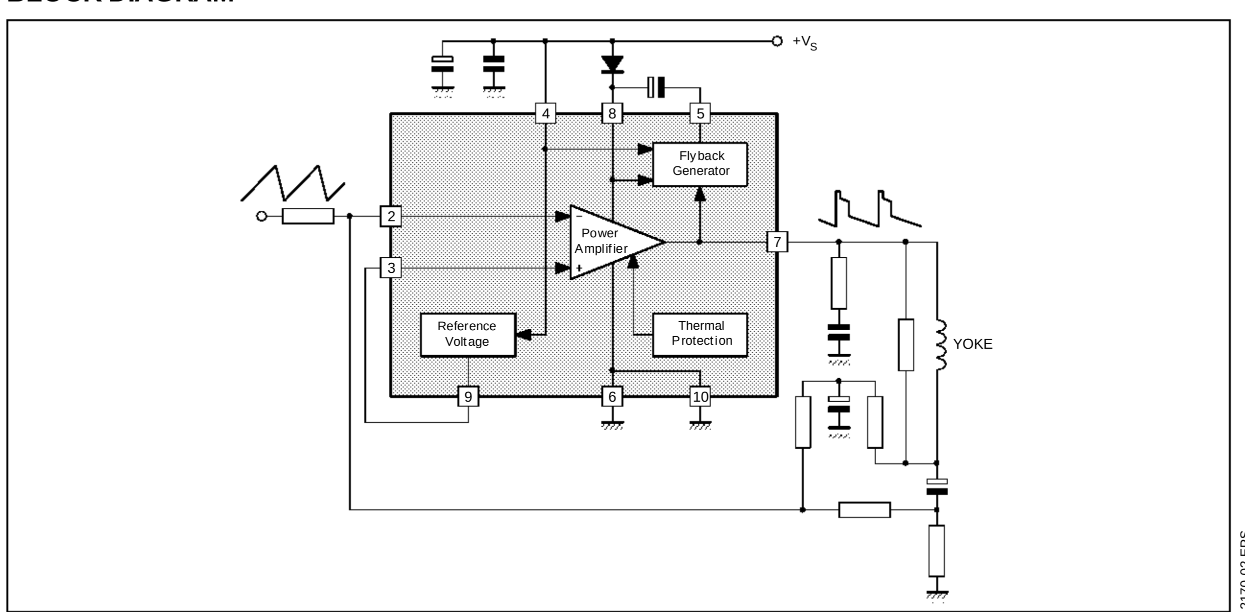
DESCRIPTION

The TDA2170 is a monolithic integrated circuit in 11-lead Multiwatt® package. It is a high efficiency power booster for direct driving of vertical windings of TV yokes. It is intended for use in Colour are B & W television receivers as well as in monitors and displays.

PIN CONNECTIONS



BLOCK DIAGRAM



SCHEMATIC DIAGRAM

7
4
8
5
3
2
6
10
9
Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11 Q12 Q13 Q14 Q15 Q16 Q17 Q18 Q19 Q20 Q21 Q22 Q23 Q24 Q25 Q26 Q27 Q28 Q29
D1 D2 D3 D4 D5 D6 D7 D8 D9
R1 R2 R3 R4 R5 R6 R7 R8 R9 R11 R12 R12 R13 R14 R15 R16 R17 R18
C1 C2
Z1 Z2
2170-03.EPS

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_s	Supply Voltage (pin 4)	35	V
V_7, V_8	Flyback Peak Voltage	60	V
V_5	Voltage at Pin 5	+ V_s	
V_2, V_3	Amplifier Input Voltage	+ V_s – 0.5	V
I_o	Output Peak Current (non repetitive, t = 2 msec)	2.5	A
I_o	Output Peak Current at f = 50 Hz, t ≤ 10 µsec	3	A
I_o	Output Peak Current at f = 50 Hz, t > 10 µsec	2	A
I_5	Pin 5 DC Current at $V_7 < V_4$	100	mA
I_5	Pin 5 Peak to Peak Flyback Current at f = 50 Hz, t_{fly} ≤ 1.5 msec	3	A
P_{tot}	Total Power Dissipation at T_{case} = 60 °C	30	W
T_{stg}, T_j	Storage and Junction Temperature	– 40 to 150	°C

2170-01.TBL

THERMAL DATA

Symbol	Parameter		Value	Unit
$R_{th\ (j\text{-}c)}$	Thermal Resistance Junction-case	Max	3	°C/W
$R_{th\ (j\text{-}a)}$	Thermal Resistance Junction–ambient	Max	40	°C/W

2170-02.TBL

ELECTRICAL CHARACTERISTICS

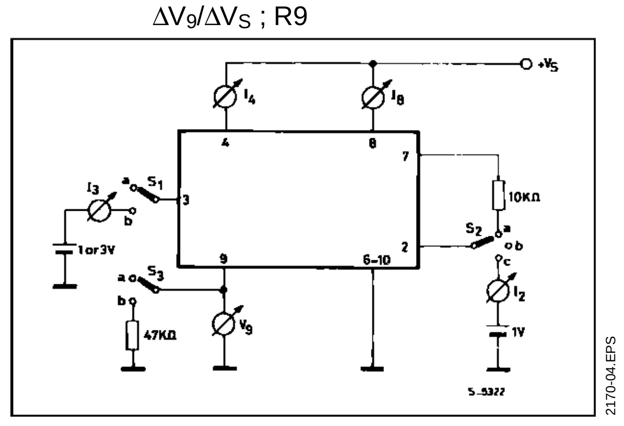
(refer to the test circuits, V_S = 35 V, T_{amb} = 25 °C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit	Fig.
I_4	Pin 4 Quiescent Current	$I_5 = 0$; $I_7 = 0$; V_3 = 3 V		8	16	mA	1a
I_8	Pin 8 Quiescent Current	$I_5 = 0$; $I_7 = 0$; V_3 = 3 V		16	36	mA	1a
I_3	Amplifier Input Bias Current	V_3 = 1 V		– 0.1	– 1	µA	1a
I_2	Amplifier Input Bias Current	V_2 = 1 V		– 0.1	– 1	µA	1a
V_9	Reference Voltage	$I_9 = 0$		2.2		V	1a
$\frac{\Delta V_9}{\Delta V_S}$	Reference Voltage Drift vs. Supply Voltage	V_S = 15 to 30 V		1	2	mV/V	1a
V_{5L}	Pin 5 Saturation Voltage to GND	I_5 = 20 mA		1		V	1c
V_7	Quiescent Output Voltage	V_S = 35 V ; R_a = 13 kΩ		18		V	1d
		V_S = 15 V ; R_a = 13 kΩ		7.5		V	1d
V_{7L}	Output Saturation Voltage to GND	I_7 = 1.2 A		1	1.4	V	1c
		I_7 = 0.7 A		0.7	1	V	1c
V_{7H}	Output Saturation Voltage to Supply	– I_7 = 1.2 A		1.6	2.2	V	1b
		– I_7 = 0.7 A		1.3	1.8	V	1b
R_9	Reference Voltage Output Resistance			2.1		kΩ	
T_j	Junction Temperature for Thermal Shut Down			140		°C	

2170-03.TBL

Figure 1 : DC Test Circuits

Figure 1a : Measurement of I_2 ; I_3 ; I_4 ; I_8 ; I_9 ; $\Delta V_9/\Delta V_S$; R9



S1 : (a) I_2 ; (b) I_3, I_4 and I_8.
S2 : (a) I_4 and I_8 ; (b) I_3 ; (c) I_2.
S3 : (a) I_2, I_3, I_4, I_8, I_9 and V_9 ; (b) R9.

Figure 1b : Measurement of $V7_H$

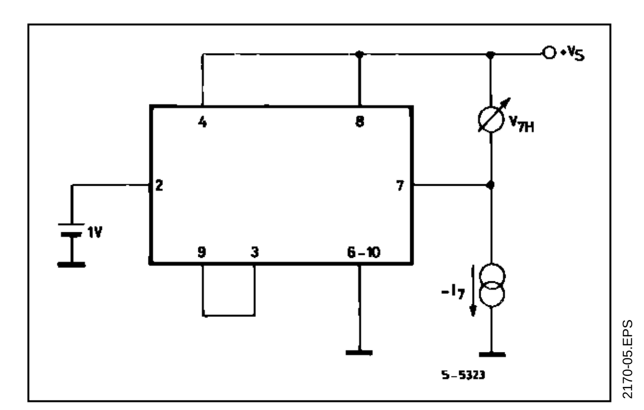
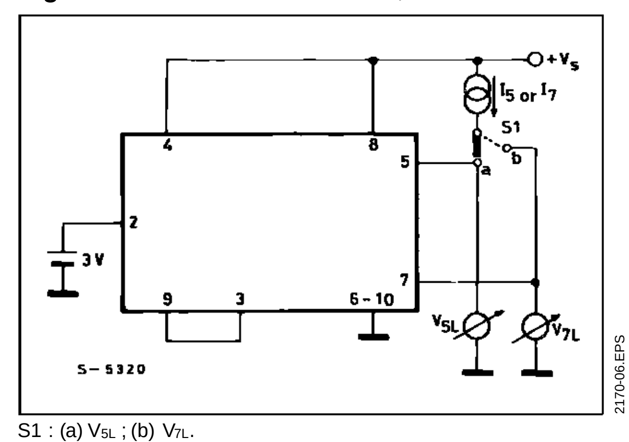


Figure 1c : Measurement of V_{5L}, $V_{7.L}$.



S1 : (a) V_{5L} ; (b) V_{7L}.

Figure 1d : Measurement of V_7.

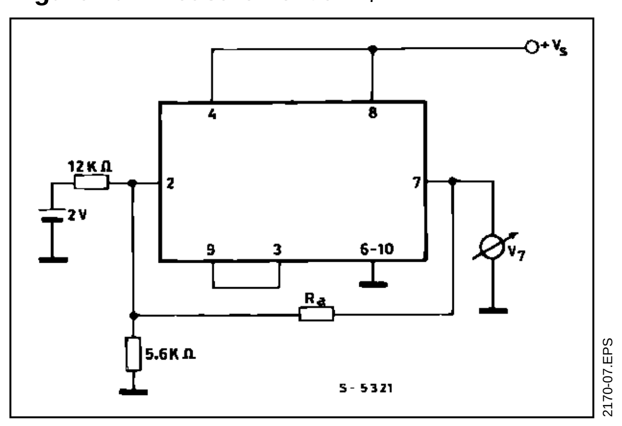


Figure 2 : Application Circuit

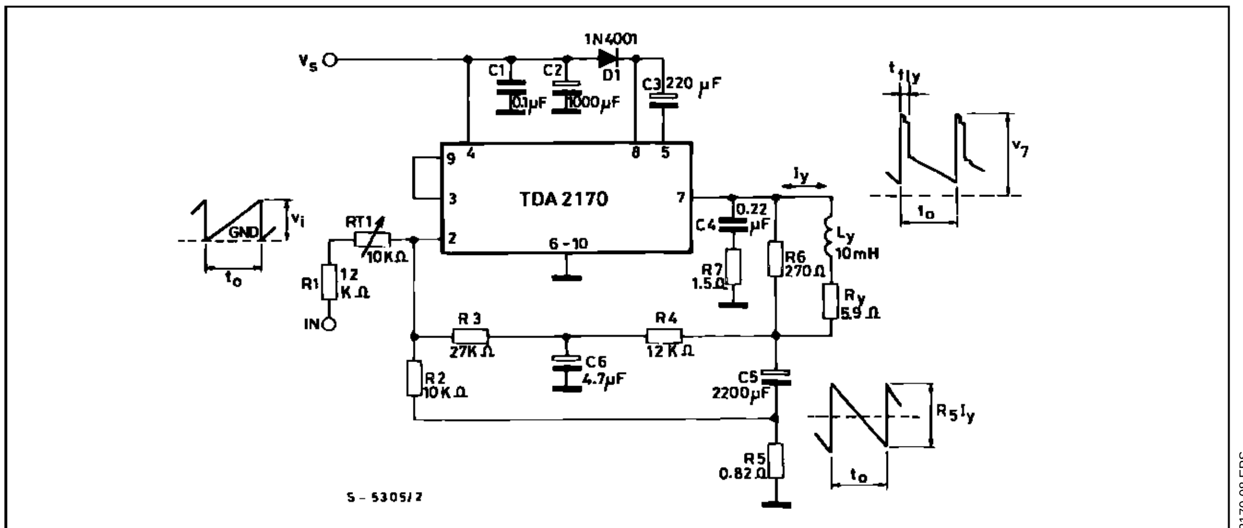
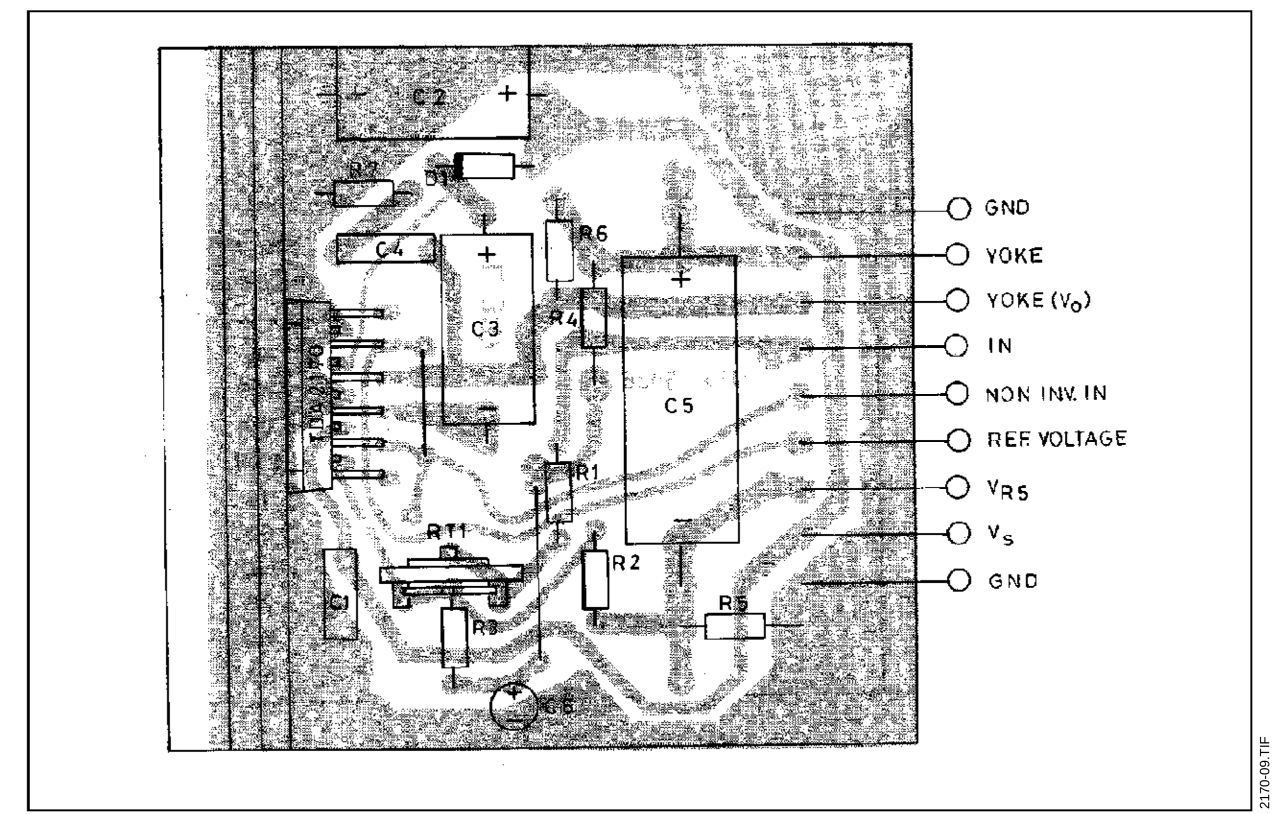


Figure 3 : PC Board and Component Layout (1:1 scale)



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COMPONENTS LIST FOR TYPICAL APPLICATIONS

Component	110° TVC 5.9 Ω / 10 mH 1.95 App	110° TVC 9.6 Ω / 24.6 mH 1.2 App	90° TVC 15 Ω / 30 mH 0.82 App	Unit
RT1	10	4.7	10	kΩ
R1	12	10	12	kΩ
R2	10	5.6	5.6	kΩ
R3	27	12	18	kΩ
R4	12	8.2	5.6	kΩ
R5	0.82	1	1	Ω
R6	270	330	330	Ω
R7	1.5	1.5	1.5	Ω
D1	1N 4001	1N 4001	1N 4001	–
C1	0.1	0.1	0.1	µF
C2 el.	1000/25 V	470/25 V	470/25 V	µF
C3 el.	220/25 V	220/25 V	220/25 V	µF
C4	0.22	0.22	0.22	µF
C5 el.	2200/25 V	2200/25 V	1000/16 V	µF
C6 el.	4.7/16 V	4.7/16 V	10/16 V	µF

2170-04.TBL

TYPICAL PERFORMANCES

Parameter	110° TVC 5.9 Ω / 10 mH	110° TVC 9.6 Ω / 27 mH	90° TVC 15 Ω / 30 mH	Unit
V_s – Supply Voltage	24	22.5	25	V
I_s – Current	280	175	125	mA
t_{fly} – Flyback Time	0.6	1	0.7	ms
* P_{tot} – Power Dissipation	4.2	2.5	2.05	W
* $R_{th\ c-a}$ – Heatsink	7	13	16	°C/W
T_{amb}	60	60	60	°C
$T_{j\ max}$	110	110	110	°C
t_o	20	20	20	ms
V_i	2.5	2.5	2.5	V_{PP}
V_7	50	47	52	V_P

2170-05.TBL

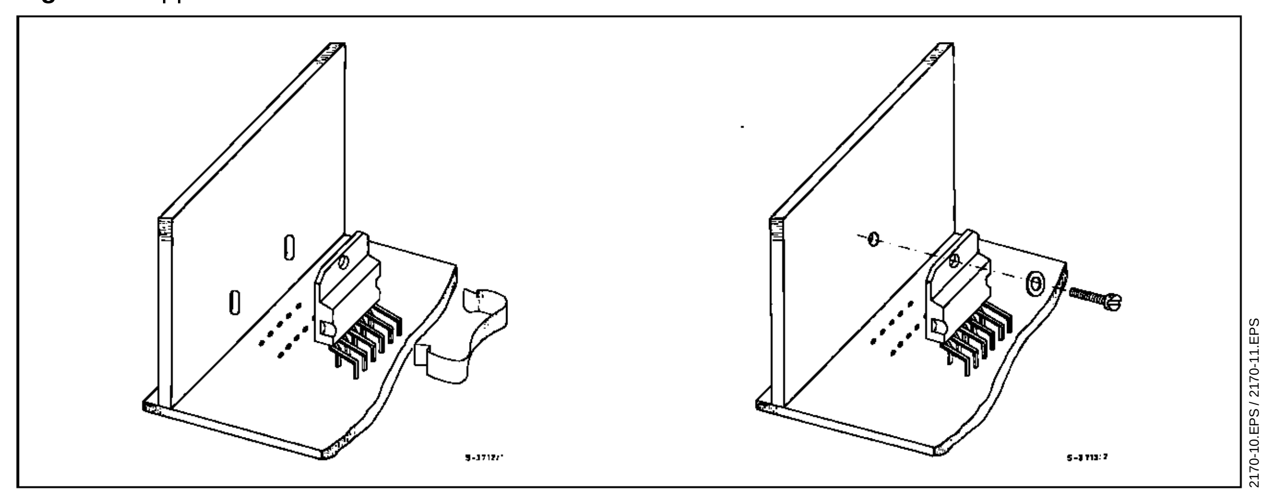
* Worst case condition.

MOUNTING INSTRUCTIONS

The power dissipated in the circuit must be removed by adding an external heatsink.

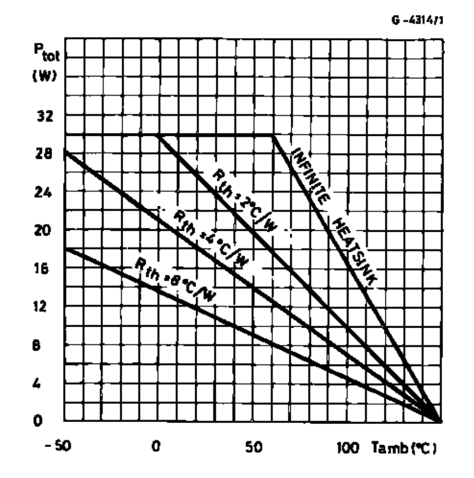
Thanks to the MULTIWATT® package attaching the heatsink is very simple, a screw or a compression spring (clip) being sufficient. Between the heatsink and the package it is better to insert a layer of silicon grease, to optimize the thermal contact ; no electrical isolation is needed between the two surfaces.

Figure 2 : Application Circuit



2170-10.EPS / 2170-11.EPS

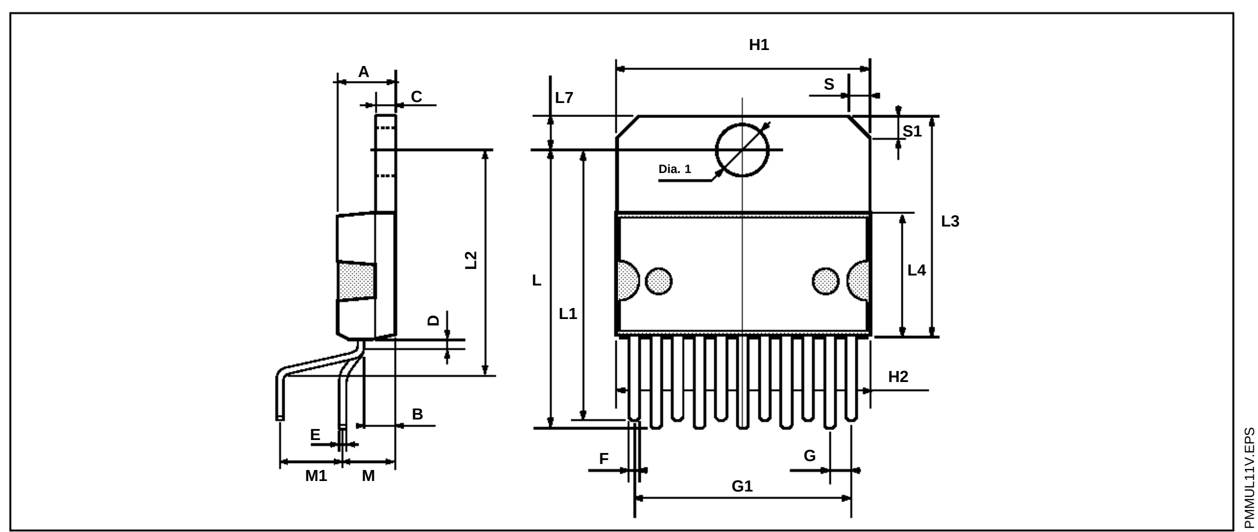
Figure 5 : Maximum Allowable Power Dissipation versus Ambient Temperature



2170-12.EPS

PACKAGE MECHANICAL DATA

11 PINS - PLASTIC MULTIWATT



Dimensions	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			5			0.197
B			2.65			0.104
C			1.6			0.063
E	0.49		0.55	0.019		0.022
F	0.88		0.95	0.035		0.037
G	1.57	1.7	1.83	0.062	0.067	0.072
G1	16.87	17	17.13	0.664	0.669	0.674
H1	19.6			0.772		
H2			20.2			0.795
L	21.5		22.3	0.846		0.878
L1	21.4		22.2	0.843		0.874
L2	17.4		18.1	0.685		0.713
L3	17.25	17.5	17.75	0.679	0.689	0.699
L4	10.3	10.7	10.9	0.406	0.421	0.429
L7	2.65		2.9	0.104		0.114
M	4.1	4.3	4.5	0.161	0.169	0.177
M1	4.88	5.08	5.3	0.192	0.200	0.209
S	1.9		2.6	0.075		0.102
S1	1.9		2.6	0.075		0.102
Dia. 1	3.65		3.85	0.144		0.152

MUL11V.TBL

